IMPACT OF THE PLANT PROTECTION PRACTICES ON THE OPERATORS' EXPOSURE: SURVEY BY THE COMMUNES AND MINISTRY OF EQUIPMENT AND TRANSPORT (MET-RW)

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Summary

In order to gain a better understanding of non-agricultural pesticide use and to prepare the legislative and technical dossiers required under the Water Framework Directive, between October 2006 and March 2007, two surveys were conducted of 97 Walloon communes and 65 districts of the Walloon Ministry of Public Works and Transport (MET) (General Directorates for Motorways and Roads and for Waterway Infrastructure). The questionnaire (26 questions on six topics) was sent by e-mail or fax, with a response rate of 60 out of 97 communes and 33 out of 65 districts. This article describes the health-related aspects of the surveys (environmental aspects are the subject of separate article). The surveys have brought to light a number of bad practices and a growing awareness of the non-agricultural users with respect to health risks. However, bad habits, legislation infringements and a failure to follow good plant protection practice are still a problem and pose major health risks (which endanger the operator and the public). Information, awareness-raising and, especially, training of people therefore remain a priority for non-agricultural users.

Introduction

Whereas the agricultural plant health practices are rather well-known, there is a notorious lack of information on the non-agricultural practices. Although the quantities applied by the non-agricultural users are largely lower than those used in agriculture, the risks for the operator are generally much higher because of the important recourse to the small sprayers. The risks for the public can also be high since many treatments are realized in public areas.

As part of a collaboration effort between the Walloon Region of Belgium (Surface Water Department of the General Directorate for Natural Resources and the Environment (DGRNE)) and the Gembloux Agricultural University (FUSAGx), two surveys were conducted to ascertain the plant protection practices of non-agricultural pesticide users. The first survey was of communes and supplements two prior surveys. The second survey was of the Walloon Ministry of Public Works and Transport (MET) - distributed into departments each containing various districts - which manages the following aspects:

- Road and motorway network and infrastructure.
- Waterways, inland ports, dams, locks and hydraulic lifts.
- Regional airports and public airfields.
- Mobility and intermodal transport.
- Walloon government buildings.
- Telecommunications (fibre optic network, digital audio broadcasting, cyber schools, etc).

The main aim of these surveys is to gain an overview as objective and representative as possible of the plant protection practices of non-agricultural pesticide users. This will allow an informed choice to be made of the measures that will be included in the WFD programmes of measures. The survey results have also influenced the current debate on the amendment of Walloon legislation of 1984 and 1986 banning the use of herbicides in public places.

Study methodology

The study methodology has already be detailed elsewhere [D. Godeaux *et al.* (2008) – *Environmental aspects in plant protection practices of non-agricultural users : case study of communes and the Ministry of Public Works and Transport (MET) of the Walloon Region (Belgium)* - Communications in Agricultural and Applied Biological Sciences, same volume, in press].

Background of the study

The surveys were carried out throughout the Walloon Region of Belgium, divided into 5 provinces: Brabant Wallon, Hainaut, Liege, Luxembourg and Namur. The first survey covers a selection of communes and the second covers two general directorates of the Walloon Ministry of Public Works and Transport (MET): the General Directorate for Motorways and Roads and the General Directorate for Waterway Infrastructure.

Data collection

The survey of communes took place over a three-month period (late October to December 2006) and that of the MET took place over a 3-4 month period (late November 2006 to March 2007). The data were collected by means of:

- A questionnaire sent directly by e-mail or fax to the people responsible for phytosanitary treatments.
- Telephone contacts and visits to obtain further information on the replies provided.

Questionnaire structure

The questionnaire focused mainly on the conditions of pesticide use and health and environmental impacts. There is very little difference between the ‘communes’ questionnaire and the MET questionnaire (apart from a few changes concerning the type of surface treated). The 26 questions were divided into 6 topics:

- General (two questions).
- Techniques used (two questions).
- Choice of techniques, interventions and products (four questions).
- Product storage (two questions).
- Product application: equipment and method (14 questions).
- Information (two questions)

Survey results

General

The response rate was remarkably high for a survey of this kind: 62% (60/97) for the communes survey and 51% (33/65) for the MET survey. In each of the following graphs, the response rate is

cited as a percentage of all replies. However, not all the communes and districts that participated in the surveys necessarily answered all the questions. To simplify matters, where no response was given to a question, a negative answer was recorded to ensure that all the percentages were calculated in relation to the total number of replies (60 communes and 33 districts).

Types of surface treated and techniques used

The surfaces treated (all treatments combined) are essentially impermeable or not very permeable : gravel and cobblestones, as well as kerbs, gutters and collectors, despite being banned by current legislation (Walloon Regional Executive Decrees (AERW) of 1984 and 1986 banning the use of herbicides on certain public property). All these surfaces are attended by the public which is potentially exposed during the application of plant protection products.

Of all the treatments, chemical pest control is the most commonly-used form of control by both communes (95%) and the MET (88%), followed by manual treatment, then mechanical treatment (brush-weeding + cutting). Only four communes use heat treatment. These non-agricultural users were asked what they thought about non-chemical techniques. The vast majority believe that non-chemical techniques require more personnel. Forty-seven percent of communes and 51% of districts believe that non-chemical techniques are suited to the situations encountered in the field. Not many have already tried integrated pest management (30% of communes and 21% of districts). Their feeling is that integrated pest management requires more work and in some cases is less effective than chemical control.

Choice of techniques, interventions and products

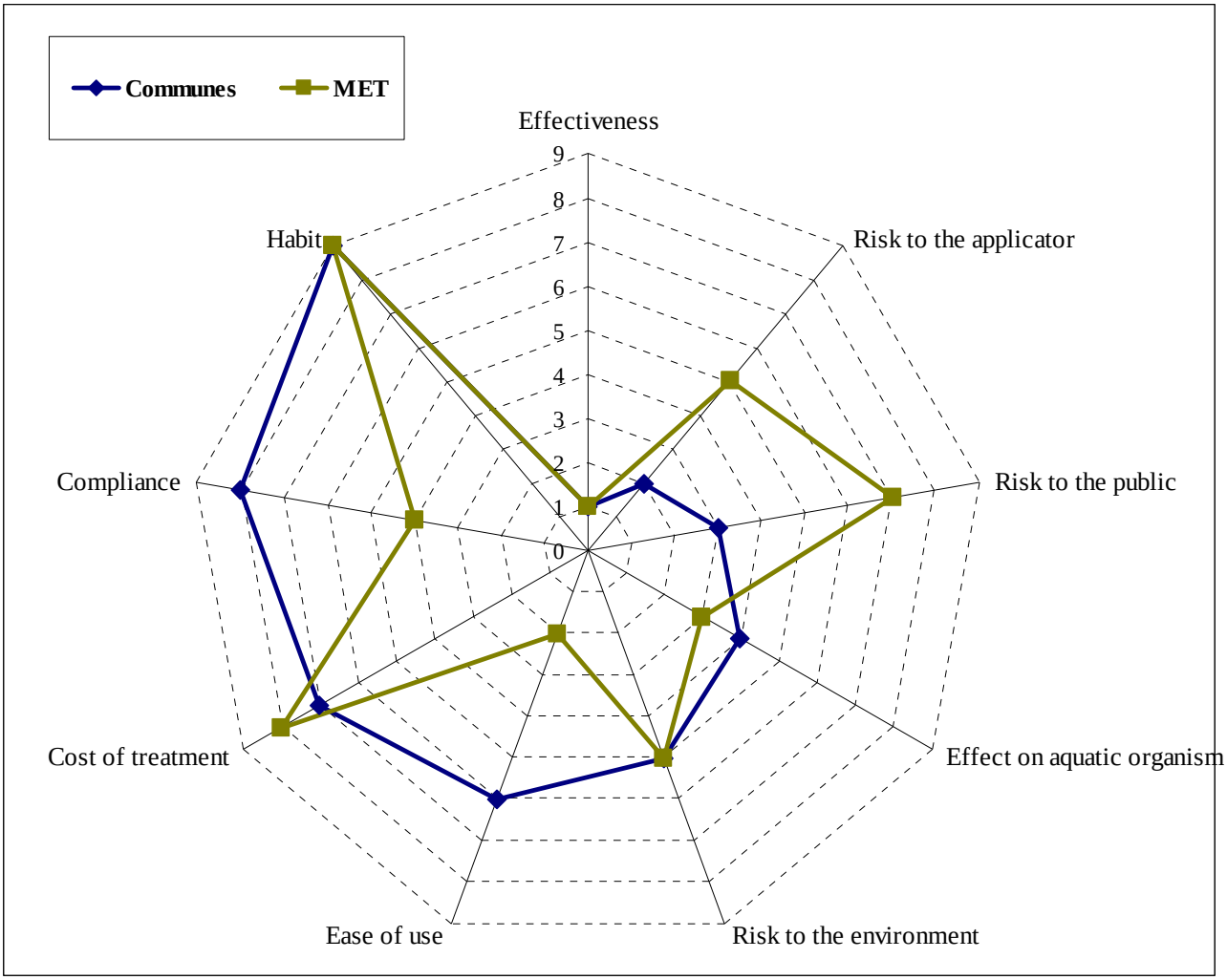
Treatment frequency: although the majority of non-agricultural users (67% of communes and 64% of districts) treat when they notice weeds or pests, there are still 47% of communes and 42% of districts that systematically treat according to a fixed schedule (for both mechanical and chemical treatments).

Treatment decision: It is mainly the department head that takes the treatment decision (65% of communes and 73% of districts) but, in some cases, it is municipal councillors who decide (particularly in small communes). In many cases, the decision is taken jointly by several people (e.g. department head and applicator).

Criteria for the treatment decision: for both communes and the MET, the foremost criterion for the treatment decision is cleanliness, then safety, aesthetics and demand from residents.

Factors influencing the choice of technique: Graph 1 represents the respective importance of the factors involved in choosing treatment techniques (with 1 ranking as the most important and 9 the least important).

For non-agricultural users, effectiveness is the most important criterion for choosing a technique. The next most important criterion for communes is risk, then ease of use, cost, regulations and habit. The MET attributes more importance to ease of use and regulations than to risk, cost and habit. It has not been possible to confirm this information in the field. The replies would appear to be somewhat fanciful, judging by the rest of the questionnaire. It is surprising to find cost so far down in the ranking when all complain of lack of funding. Compliance with regulations is also considered to be of little importance (especially to communes). Indeed, there are many infringements of legislation but controls are virtually non existent.



Graph 1. Elements guiding a non-agricultural user's choice of treatment techniques. (1 = most important – 9 = least important)

Storage of plant protection products

53% of communes and 73% of districts have a special room for storing pesticides. 32% of communes and 45% of districts affix pictograms of danger (such as death's-head) on the door from the storage room, which is closed with a key in 73% of communes and 64% of districts.

Application of plant protection products: equipment and method

Type of equipment used: the most common type of equipment used by non-agricultural users is the knapsack sprayer (93% of communes and 73% of districts), then rotary brush weeders (65% of communes and 51% of districts) and trailer-mounted wand sprayers (63% of communes and 45% of districts). Some communes use ramp-mounted sprayers without apparently being aware that they are subject to a compulsory technical inspection every three years. A minority (25% of communes and 15% of districts) state that they calibrate and/or adjust their equipment every one to three years.

Who conducts phytosanitary treatments? In most cases, it is the administration itself that carries out the treatments (92% of communes and 70% of districts). Owing to staff shortages, the MET makes more frequent use of external service providers (5% of communes and 33% of districts). Only one commune and four districts state that they no longer use any plant protection products at all.

Calculating the quantity of product to be applied: in most cases it is the applicator who calculates the correct proportion of product to be applied (without necessarily having the expertise to do so) (50% of communes and 48% of districts).

However, in many cases, several people jointly calculate the dosage rate of product (e.g. the department head and the applicator, the supervisor and the applicator, and so forth). In nine MET districts out of 28, it is the external service provider who calculates the proportion.

Most commonly-used plant protection products

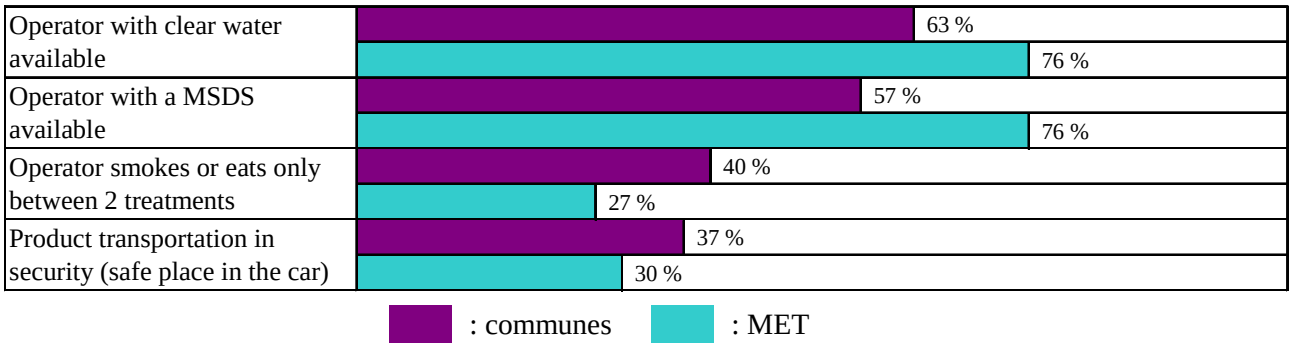
The communes use an average of 2.4 products per commune, whilst the MET uses only 1.8 products per district. Table 1 below lists the main products.

Table 1. Main plant protection products used by the communes and the MET (all herbicides)

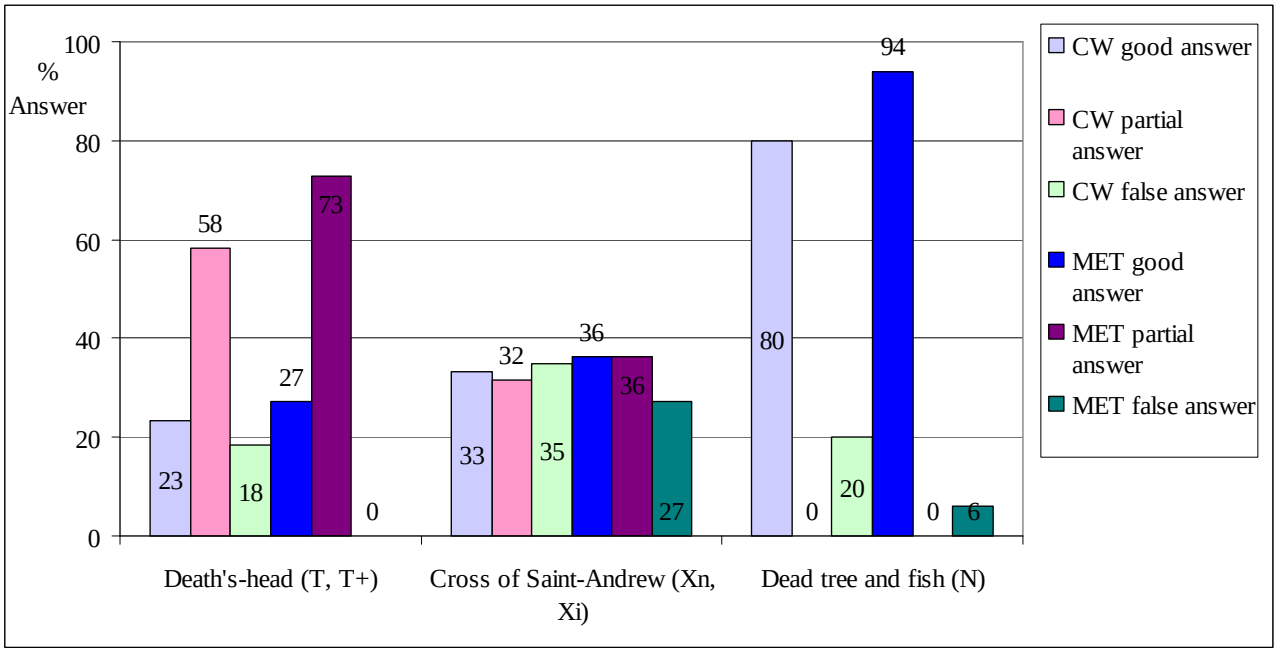
Active substance and concentration	Commercial product	Communes (%)	MET (%)
Glyphosate 360 to 450 g/l - liquid	Various products	43	70
Glyphosate with other active substances (diflufenican, diuron, oxadiazon, etc.) - liquid	Various products	72	64
112 g/l glyphosate + 15 g/l diflufenican + 71 g/l diuron - liquid	CANYON®	43	39
6.75% dichlobenil - granules	CASORON GR®	30	15
Triclopyr: 100 or 480 g/l - liquid	Various products	18	24
10.8% glyphosate + 30% oxadiazon - wettable powder	KID ALLEES®	17	-
25% flazasulfuron – wettable granules	CHIKARA®	12	-
40 g/l diflufenican + 250 g/l glyphosate - liquid	ZAPPER®	12	21
20 g/l clopyralide + 40 g/l fluroxypyr + 200 g/l MCPA - liquid	BOFIX®	10	15

Certain communes and MET districts use pesticides that have not been licensed for non-agricultural use, as well as products not approved in Belgium. The vast majority of products (87% in communes and 78% in districts) are applied in springtime (from late March to June).

The information concerning the dosage rates of product to be applied is often incomplete and no conclusions can be drawn from it. Certain products are applied at a lower than standard dose (e.g. CASORON GR®). The application frequency and period do not always comply with the instructions on the label (e.g. applying CANYON® twice a year instead of once a year).



Graph 2. Knowledge and consideration for the health risks during the treatment by non-agricultural users.



Graph 3. Knowledge of the significance of the safety pictograms by the non-agricultural users. (CW: communes - MET: districts)

Like Graph 3 shows it above, the knowledge of the significance of the safety pictograms by the non-agricultural users is unfortunately often incomplete even incorrect (especially for the “Death's-head” and the “Cross of Saint-Andrew”).

Personal protective equipments (PPE)

- Use of PPE at the time of the various phases during application

Table 3 hereafter shows the percentages of PPE systematically worn at the time of the various treatment phases. If the operators are rather conscious of the need for protecting their hands, body’s protective equipments are not often used. In addition, for 10 communes and 13 districts, the applicators use their usual working clothes.

In general, it is *during spraying* that the users are most protected whereas the riskiest moment remains mixing/loading since concentrated products are handled. A lack of protection for the phases of cleaning and rinsing is usually observed.

- PPE management

Although 45% of communes and 48% of districts state to carry out an active management of the PPE, it is noted that:

- only 58% of communes and 42% of districts inform their personnel on PPE before treatments ;
- 37% of communes and 39% of districts use latex gloves which are not adapted to handle those chemicals ;
- 73% of communes change the gloves regularly but only 37% rinse them before withdrawing them ;
- 70% of districts change the gloves regularly but only 39% rinse them before withdrawing them.

It thus remains much to do in the information and the sensitizing of the non-agricultural users with respect to the adequate use of PPE. 87% of the communes and 70% of the districts declared that the risk for the operator is considered as "*important*" or even "*very important*" regarding to the choice of the techniques of treatment. Sometimes, the PPE are available but the workmen balk to use them pretexting a lack of comfort.

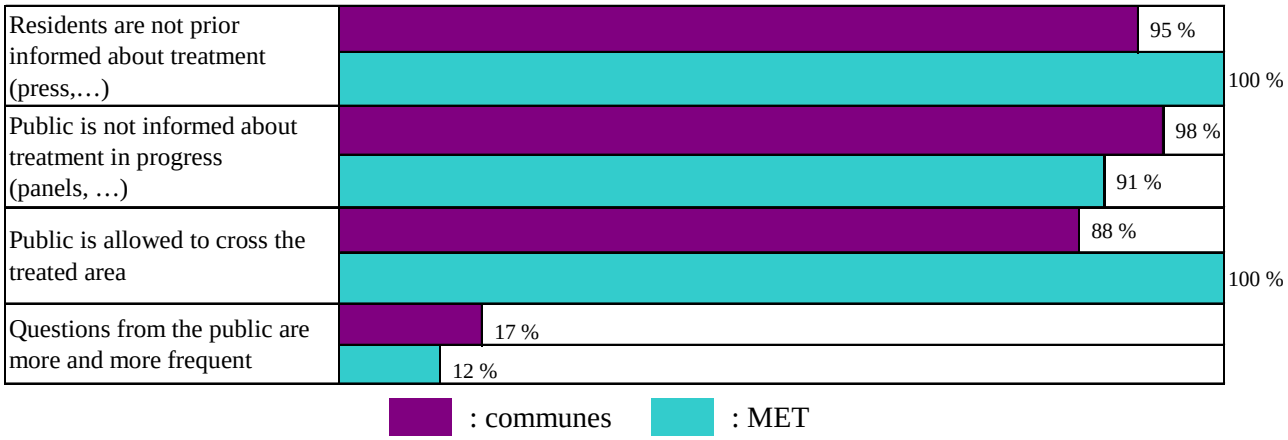
Table 2. Frequency (% of operators) of PPE worn during the various phases of application (CW: communes - MET: districts)

Personal protective equipments (PPE)	Mixing & Loading		Spraying		Cleaning		Rinsing	
	CW	MET	CW	MET	CW	MET	CW	MET
Gloves	70 %	58 %	67 %	61 %	68 %	58 %	57 %	54 %
Boots	28 %	45 %	35 %	45 %	30 %	42 %	23 %	39 %
Goggles	20 %	30 %	22 %	30 %	17 %	30 %	15 %	30 %
Nontight coverall	20 %	24 %	22 %	24 %	20 %	24 %	18 %	24 %
Tight coverall	15 %	6 %	17 %	6 %	17 %	6 %	8 %	6 %
Dust mask	13 %	15 %	17 %	15 %	15 %	15 %	12 %	15 %
Cartridge mask	17 %	6 %	18 %	6 %	15 %	6 %	12 %	6 %

Information about plant protection products

The non-agricultural users was asked about which extra informations they would like to see reproduced on the product labels. The few suggestions relate to the dosage of the product (more detailed indication, more practical units), the legibility (too small characters) and a more comprehensive information, the duration of product's efficacy, the optimum conditions of temperature and moisture for the treatment, side effects related to the product and the symptoms of an intoxication.

Public information



Graph 4. Public information.

The information of the public related to the treatments with pesticides is an important point of discussion within the working panels of the Belgian Programme of Pesticides and Biocides Reduction (PRPB). It is also planned to extend in Belgium a model of panel indicating the treatment in progress. The same panel would be used in the various areas of the country so as to be comprehensible by all including the tourists. The panel valid for the agricultural and non-agricultural treatments will mention informations such as the name of the product applied (and its active ingredient), the amount applied, the date of treatment, the time of re-entry (i.e. duration between the treatment and the free access to the treated area).

Conclusions

Like the previous surveys, these surveys have shown that a lot still remains to be done to achieve sustainable and responsible use of pesticides in the non-agricultural sector. Work is needed in the following areas:

- Improving communication.
- Raising the awareness of stakeholders: users (applicators) and purchasing decision-makers.
- Training applicators in good plant protection practice.
- Checking the application equipment used.
- Gearing current legislation to real requirements in the field and to the need to control risk.
- Promoting alternative methods.

With regard to improving **communication**, tools already exist, such as the Phytoweb site and the website of the Regional PHYTO Committee (*Comité Régional Phyto*), the Walloon advisory committee on environmentally-sound pesticide use, as well as the Committee's publications (in particular the guide to good weed-control practice in green areas and public highways (*Guide de Bonnes Pratiques de Désherbage des Espaces Verts et des Voiries* published in 2006). There are still too many communes which do not inform the operators on personal protective equipments (PPE) before application.

Raising awareness of stakeholders calls for the involvement of a whole series of bodies, such as the Regional PHYTO Committee, Phytofar non-profit association (especially the Phytofar-Recover scheme), ADALIA non-profit association, Pôle de Gestion Différenciée des Espaces Verts, SPGE, the public agency in charge of coordinating water management in Wallonia (and its 'Eau Secours' campaign), PhytEauWal non-profit association, and others.

Whilst awareness-raising actions should focus mainly on applicators, it is also important to raise awareness among decision-makers. Indeed, it is they who govern the process by dictating the options and the products that will be used. A few examples of awareness-raising actions: meeting of Walloon river contracts *(contrats de rivière)* to discuss pesticides in water; demonstration days of alternative equipment; brochures, and so forth. … It is necessary also to improve control of the port of PPE even if the applicators do not find that very "comfortable".

It is also important to develop **training** for applicators. This aspect is addressed by the Federal Programme for Reducing the Agricultural Pesticides and Biocides (PRPB). An inventory of training courses available in the Walloon Region was made in the first half of 2007 to take into account the requirements of the future European regulations currently under discussion. Around twenty organisations dispense training to a highly varied audience (from private individuals to farmers and landscape gardeners to public services) and, although some courses are more advanced than others, in general they all provide a broad overview of good plant protection practice. There is an urgent need of training for the non-agricultural users. It is important to learn the good practices which will limit to the maximum the exposure of the applicator (but also of the public) to the plant protection products. The Walloon new legislation relating to the use of the pesticides in public areas will put forward the training of the applicators and the decision makers.

The new decree on pesticide use in public places that is currently being drafted should serve as the basis for redefining the plant protection practices of communes and the MET, as well as for monitoring compliance with legislation and good plant protection practice. The decree will therefore advocate **alternative methods** to chemical control, which all too few non-agricultural users are using as yet. Users' main complaint about alternative methods is that they take more time and that the equipment is often costly for an effectiveness (compared with chemical control) that does not always live up to expectations. The promotion of such alternative techniques calls for communication, awareness-raising and training. A number of organisations specialise in alternative methods (e.g. ADALIA).

Acknowledgments

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